Year 13 Chemistry Curriculum Overview

Rationale: The Year 13 Chemistry curriculum is designed to further explore and investigate Chemistry by building a mind-set that allows skills to be continuously developed. Students will study and experience modules such as organic synthesis and analysis, trends in reactivity of compounds and factors that influence chemical reaction systems. In doing so students will develop their practical and investigative skills.

Term/Length of Time	Outline	Assessment/Teacher Feedback Opportunities	Homework and Literacy resources
Physical Chemistry 42 lessons (including assessment and responding to feedback lessons)	<u>Section 1 Physical Chemistry 2</u> Students will further their knowledge of Year 12 energetics through the study of thermodynamics which is important in understanding the stability of compounds and why chemical reactions occur. Students should be familiar with the mathematical relationship between rate of reaction and concentration and gives information about the mechanism of a reaction Student will build on their knowledge of Kc in Year 12 and study the equilibrium constant K p which enables students to analyse how equilibrium yield will be influenced by the partial pressures of reactants and products. Students will apply their Year 12 knowledge of redox reactions to electrochemical cells These have very important commercial applications as a portable supply of electricity to power electronic devices Students will deepen their knowledge of acids and bases using the logarithmic scale, pH, to measure acidity. Buffer	Thermodynamics, Rate equations, Kp, Electrochemical Cells and Acids and Bases end of topic assessments in the style of exam questions Written and verbal feedback given throughout module through in-class activities and homework.	Homework is set weekly and contains a mixture of recall exam-style questions as well as more detailed application based exam style questions. All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks **Optional homework tasks and Literacy resources:** SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, model answers, short answer questions, exam questions, mark schemes, examiner's reports as well as homeworks. <u>**Chemistry**</u> offers many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a PLC (Personnel Learning checklist) which students will engage with throughout the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format.

	solutions, which can be made from partially neutralised weak acids will be studied which have many important industrial and biological applications. <u>Skills</u> • Use logarithms in relation to quantities that range over several orders of magnitude# • Recognise and make use of appropriate units in calculation • Determine the slope and intercept of a linear graph • Calculate rate of change from a graph showing a linear relationship • Measure rates of reaction by at least two different methods, for example: an initial rate method such as a clock reaction and a continuous monitoring method • Set up electrochemical cells and measuring voltages • Use acid–base indicators in titrations of weak/strong acids with weak/strong alkalis • Measure pH using pH charts, or pH meter, or pH probe on a data logger • Investigate how pH changes when a weak acid reacts with a strong base and when a strong acid reacts with a weak base		Students will also review and connect information within topics. **Useful websites:** https://chemrevise.org/ http://chemguide.co.uk/ http://www.physicsandmathstutor.com/ http://www.docbrown.info/ https://www.youtube.com/results?search_query=machemguy https://www.khanacademy.org/ https://chemrevise.org/revision-guides/ https://www.youtube.com/@MrERintoul **Reading list:**

			CHEMISTRY – SIXTH FORM READING LIST *50 chemistry ideas you really need to know* Hayley Birch Quercus 2015 *Chemistry at Home* J.Emsley RSC 2015 *The Chemistry of Explosives* * Jacqueline Akhavan RSC Publishing, 2011. *Elements of Physical Chemistry (5th edition)** 1992 edition in stock P. Atkins and J. de Paula OUP, 2009. *Foundations of Organic Chemistry* M. Hornby and J. Peach OUP, 1993. *Inorganic Chemistry (5th edition)* D.F. Shriver and P.W. Atkins OUP, 2009. *Napoleon's Buttons: How 17 Molecules Changed History* * Penny Le Couteur and Jay Burreson Penguin, 2004. *Oxygen: The molecule that made the world* * Nick Lane OUP, 2003. *The Periodic Kingdom* * P.W. Atkins
Inorganic Chemistry 30 lessons (including assessment and responding to feedback lessons)	<u>Section 2 Inorganic Chemistry 2</u> Students should be familiar with the reactions of the Period 3 elements with oxygen. Students will analyse the trends in properties across this period and provide explanations of how and why these reactions occur Students will study the transition metals in terms of their uses, reactions and properties including the reactions of the transition metal ions in aqueous solutions. <u>Skills</u> • Carry out simple test-tube reactions to identify transition metal ions in aqueous solution	Period 3 and their oxides, Transition metals and Reactions of aqueous ions end of topic assessments in the style of exam questions Written and verbal feedback given throughout module through in-class activities and homework.	

	• Use melting point apparatus • Determine the concentration of a coloured complex ion by colorimetry. • Investigate redox titrations • Solve problems set in practical contexts • Present data in appropriate ways		
Organic Chemistry 52 lessons (including assessment and responding to feedback lessons)	<u>Section 3 Organic Chemistry 2</u> Students will expand on their knowledge of isomers to include optical isomerism. They will deepen their knowledge of organic compounds by studying aldehydes, ketones, carboxylic acids and their derivatives which all contain the carbonyl group. Students will examine structures, physical and chemical properties, reactions, reaction mechanisms and uses of these compounds. Students should be familiar with aromatic chemistry, in particular the benzene molecule Students will study the structure of amino acids, proteins and DNA and the structure, bonding and interactions within these molecules. Building on analytical techniques studied in Year 12 students should be familiar with nuclear magnetic resonance spectroscopy and chromatography which provides an important method of separating and identifying components in a mixture. <u>Skills</u>	Optical isomers, aldehydes and ketones, carboxylic acids and derivatives, aromatic chemistry, amines, polymers, organic synthesis, NMR, amino acids and chromatography end of topic assessments in the style of exam questions Written and verbal feedback given throughout module through in-class activities and homework.	

	• Preparation of: a pure organic solid and test of its purity • Separation of species by thin-layer chromatography • Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects • Use appropriate apparatus to record a range of measurements (to include mass, time, volume of liquids and gases, temperature) • Safely and carefully handle solids and liquids, including corrosive, irritant, flammable and toxic substances • Apply scientific knowledge to practical contexts • Use laboratory apparatus for a variety of experimental techniques including filtration under reduced pressure • Use melting point apparatus			